

Listing of the claims:

This listing of claims replaces all prior versions.

1. (Currently Amended) A method of operating a radio receiver having an analog portion coupled to an A/D converter, and the A/D converter coupled to a digital signal processing portion, the digital signal processing portion using digital filtering to generate a narrow-band signal from a wideband signal received from the A/D converter and to recover data from the narrow-band signal, the method comprising:

obtaining a wideband signal power estimate of total signal power reaching the A/D converter by measuring a digital signal between the A/D converter and the digital signal processing portion;

comparing the wideband signal power estimate to a wideband signal power threshold; and

responsive to comparing the wideband signal power estimate to a wideband signal power threshold, preventing the total signal power reaching the A/D converter from exceeding a maximum allowable input amplitude.

2. (Previously Presented) The method of claim 1, wherein preventing the total signal power reaching the A/D converter from exceeding a maximum allowable input amplitude comprises determining that the wide-band signal power estimate is greater than a predetermined first threshold, and, responsive thereto, reducing the gain of at least one amplifier coupled to an input terminal of the A/D converter.

3. (Previously Presented) The method of claim 2, wherein the A/D converter is a sigma-delta A/D converter that includes a decimation and filtering processing chain and the wideband signal power estimate is obtained by taking a signal from an intermediate point in the decimation and filtering processing chain.

4. (Original) The method of claim 3, further comprising detecting an in-band signal power greater than a predetermined second threshold, and, responsive thereto, reducing the gain of at least one amplifier coupled to an input terminal of the A/D converter.

5. (Original) The method of claim 1, wherein the radio receiver includes a first variable gain amplifier and the method further comprises placing the first variable gain amplifier in a low gain state if a wide-band signal power is greater than a first threshold.
6. (Original) The method of claim 1, wherein the radio receiver includes a first variable gain amplifier, and the method further comprises: determining that a wide-band signal power is less than a first threshold; and placing the first variable gain amplifier in a low gain state if a narrow-band signal power is greater than a second threshold.
7. (Original) The method of claim 6, wherein the first variable gain amplifier is placed in a low gain state if the narrow-band power is greater than the second threshold by at least a first hysteresis value.
8. (Original) The method of claim 7, wherein the first variable gain amplifier is placed in a high gain state if the narrow-band power is less than the second threshold by at least a second hysteresis value.
9. (Original) The method of claim 8, wherein the first hysteresis value and the second hysteresis value are the same.
10. (Currently Amended) A method of preventing saturation of a sigma-delta A/D converter in a radio receiver having digital channel selectivity circuitry for selecting a digital channel and decode data from the selected channel, comprising:
 obtaining [[a]] wideband power estimations taken from a digital signal prior to the digital channel selectivity circuit and [[a]] narrow-band power estimations taken from the digital signal after the digital channel selectivity circuit;
 reducing an amplifier gain of a first one of a plurality of amplifiers [[if]] in response to one of the wide-band power estimations [[is]] being greater than a first predetermined value; and

[[if]] in response to another of the wide-band power estimations [[is]] not being greater than the first predetermined value, reducing the gain of at least one of the plurality of amplifiers [[if]] in response to one of the narrow-band power estimations [[is]] being greater than a second predetermined value.

11. (Previously Presented) The method of claim 10, wherein the first predetermined value is selected so as to reduce the occurrence of ADC saturation due to out-of-band signal power, and wherein the sigma-delta A/D converter includes a decimation and filtering processing chain and the wideband power estimation is obtained by taking a signal from an intermediate point in the decimation and filtering processing chain.

12. (Currently Amended) A method of operating a radio receiver having an analog down-conversion portion including a plurality of serially coupled variable gain amplifiers, and a digital portion that performs, at least partially, a frequency selectivity function to generate a narrowband signal, the method comprising:

- a) setting each of the plurality of variable gain amplifiers to a high gain state;
- b) obtaining [[a]] wide-band signal power estimates from a digital signal prior to the frequency selectivity function;
- c) obtaining [[a]] narrow-band signal power estimates from a digital signal after the frequency selectivity function and before data is decoded from the narrow-band signal;
- d) determining if the wide-band signal power estimates [[is]] are greater than the value of a wide-band threshold;
- e) setting a first one of the plurality of variable gain amplifiers to a low gain state [[if]] in response to an affirmative [[the]] determination in (d) is affirmative;
- f) ~~if the~~ in response to a negative determination in (d) is negative, determining if a current one of the narrow-band signal power estimates is greater than the value of a narrow-band threshold; and
- g) setting the first one of the plurality of variable gain amplifiers to a low gain state [[if]] in response to the narrow-band signal power estimate [[is]] being greater than the first narrow-band threshold value plus a hysteresis value.

13. (Original) The method of claim 12, further comprising dynamically assigning a value to the wideband threshold.

14. (Original) The method of claim 13, further comprising dynamically assigning a value to the narrow-band threshold.

15. (Currently Amended) A radio receiver, comprising:

- an analog down-converter including a plurality of serially coupled variable gain amplifiers;

- an analog-to-digital converter connected to one of the plurality of variable gain amplifiers; and

- a digital baseband processor connected to the analog-to-digital converter, the digital baseband processor including frequency selectivity circuitry to generate a narrow-band signal and to decode data from the generated narrow-band signal and automatic gain control circuitry, the automatic gain control circuitry configured

 - to receive a wide-band signal power estimate obtained by measuring a digital signal between the analog-to-digital converter and the selectivity circuitry, and a narrow-band signal power estimate;

 - to compare the wide-band signal power estimate to a wide-band signal power threshold; and

 - to modify gain settings of the serially coupled variable gain amplifiers in response to comparing the wide-band signal power estimate to a wide-band signal power threshold.

16. (Original) The radio receiver of claim 15, wherein the plurality of variable gain amplifiers are coupled to the automatic gain control circuitry.

17. (Previously Presented) The radio receiver of claim 16, wherein the analog-to-digital converter is a sigma-delta analog-to-digital converter that includes a decimation and

filtering processing chain and the wide-band signal power estimate is obtained by taking a signal from an intermediate point in the decimation and filtering processing chain.

18. (Original) The radio receiver of claim 15, wherein the automatic gain control circuitry is further configured to receive a wide-band power threshold value and at least one narrow-band threshold value.

19. (Original) The radio receiver of claim 18, wherein the automatic gain control circuitry is further configured to receive at least one hysteresis value.

20. (Original) The radio receiver of claim 16, wherein the selectivity circuitry comprises digital filters.